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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/517,906

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Andrew Miller Cameron

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EXAMINER

CHEN, CHRISTINE

ART UNIT

PAPER NUMBER

4116

MAIL DATE

DELIVERY MODE

01/23/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/517,906	Applicant(s) CAMERON ET AL.	
	Examiner CHRISTINE CHEN	Art Unit 4116	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/6/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Application

Claims 1-21 are pending and presented for examination.

Priority

1. The foreign priority claim filed on December 10, 2004 was not entered because the foreign priority claim was not filed during the time period set forth in 37 CFR 1.55(a)(1). For original applications filed under 35 U.S.C. 111(a) (other than a design application) on or after November 29, 2000, the time period is during the pendency of the application and within the later of four months from the actual filing date of the application or sixteen months from the filing date of the prior foreign application. For applications that have entered national stage from an international application filed on or after November 29, 2000, after compliance with 35 U.S.C. 371, the claim for priority must be made during the pendency of the application and within the time limit set forth in the PCT and the Regulations under the PCT. See 37 CFR 1.55(a)(1)(ii). If applicant desires priority under 35 U.S.C. 119(a)-(d), (f) or 365(a) based upon a prior foreign application, applicant must file a petition for an unintentionally delayed priority claim (37 CFR 1.55(c)). The petition must be accompanied by (1) the claim (i.e., the claim required by 35 U.S.C. 119(a)-(d) and (f) and 37 CFR 1.55) for priority to the prior foreign application, unless previously submitted; (2) a surcharge under 37 CFR 1.17(t); and (3) a statement that the entire delay between the date the claim was due under 37 CFR 1.55(a)(1) and the date the claim was filed was unintentional. The Director may require additional information where there is a question whether the delay was unintentional.

The petition should be addressed to: Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Information Disclosure Statement

2. The information disclosure statement (IDS) was submitted on June 6, 2005. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Specification

3. The disclosure is objected to because of the following informalities: On page 10 line 15 "an outer tube 24 for water" and "the outer water tube 24" found on page 11 lines 10, 11, and 15 are not found on any of figures 1-3.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. The term "first part of a refining operation" in claim 19 is a relative term which renders the claim indefinite. The term "first part of a refining operation" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

3. The term "before the end of the refining operation" in claim 21 is a relative term which renders the claim indefinite. The term "before the end of the refining operation" is not defined by the claim, the specification does not provide a standard for ascertaining

the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 9-13, 15, 1 and 9-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Metz (US 4,434,005 hereinafter A1).

In regards to claim 1, Metz (A1) teaches a method of refining a melt, preferably a ferrous melt (col. 1, li. 24-27), containing solid cooling material. The method involves blowing oxygen onto the surface of the melt (col. 8, li. 18-21) and particulate matter is directed into the melt by a jet above the melt (col. 8, li. 22-29). Moreover, it is a supersonic jet with a velocity of Mach 1.5 to 2.5 (col. 8, li. 22-29). Metz (A1) teaches this jet being surrounded by at least four equispaced hard oxygen jets (col. 8, li. 42-47) at supersonic speed (col. 8, li. 33-37). However, since these four jets all perform the same function and are placed in an equidistant manner, it would have been obvious to replace them with a single oxygen jet shrouding the first jet. This is a case of the simple substitution of one known element for another to obtain predictable results.

In regards to claim 15, as mentioned earlier, the jet from which particulate material is dispersed performs at a speed of Mach 1.5 to 2.5 (col. 8, li. 22-29). In

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addition, the four oxygen jets also perform at a speed of Mach 1.5 to 2.5 (col. 8, li. 33-37).

In regards to claim 2, in Metz's invention (A1) the particulate material is a metal to be included in the refined alloy. This can be seen in the example (col. 7, li. 32- col. 8, li. 13) in which carbon is the particulate material added to the steel (col. 7, li. 50-51).

In regards to claim 3, in Metz's invention (A1) the ferroalloy contains more than 30 wt. % Fe. This can be seen in the example (col. 7, li. 33-36 and col. 8, li.9-13).

In regards to claims 9 and 10, Metz (A1) teaches the particulate matter to have "a particle size distribution such that at least 90% of the particles have a diameter less than 1 mm" (col. 8, li. 53-56).

In regards to claims 11 and 13, Metz (A1) teaches that it is the jet of neutral gas which entrains the particulate matter (col. 8, li. 22-23). Metz (A1) discloses that the term "neutral gas" is to refer to a gas which is non-oxidizing and provides an example of Argon (col. 3, li. 14-20).

In regards to claim 12, Metz (A1) reference a piece of prior art where the particulate material is entrained in a refining oxygen gas (col. 2, li. 8-11).

In regards to claim 19, it would have been obvious to one of ordinary skill in the art to try the introduction of the particulate material into the melt in a continuous manner.

In regards to claim 20, it would have been obvious to one of ordinary skill in the art to have the oxygen continue after introduction of the particulate material into the melt has ceased in order to fully oxidize the particulate material.

In regards to claim 21, it would have been obvious to one of ordinary skill in the art to have the gas jet cease before the end of the refining operation in order to conserve resources.

3. Claims 4-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Metz (A1) as applied to claim 1 above, and further in view of Edlinger (US 6,409,793 hereinafter A6).

In regards to claim 4, while Metz (A1) supports a prima facie case of obviousness for claim 1, Metz (A1) fails to teach the limitation of the instant claim. Although Metz (A1) teaches the general idea of claim 4, where “in the refining of a metal melt, especially a ferrous metal melt such as an iron melt to produce steel, it is common or desirable to introduce substantial amounts of scrap metal, alloying solids and other solid materials” (col. 1, li. 30-33). This is interpreted to support the use of ferrochrome as a ferroalloy, but not the use of oxide of chromium as the particulate material.

Edlinger (A6) however, teaches a method for processing steel slags containing chromium, in which chromium-containing and/or nickel-containing dusts are added to molten steel slags or iron carriers (abstract). This being the case, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Metz (A1) with the addition of the chromium-containing dust taught by Edlinger (A6) in order to adjust the slag basicity (abstract).

In regards to claim 5, Metz (A1) in view of Edlinger (A6) support a prima facie case of obviousness for claim 4 as well as the limitation of the instant claim. Chromite

as particulate material is a chromium-containing dust, and thus Edlinger's (A6) teaching is inclusive of this limitation.

In regards to claim 6, Metz (A1) supports a prima facie case of obviousness for claim 1 but does not teach the limitation of the instant claim. However it would have obvious to one of ordinary skill in the art to try ferrochrome as the particulate material, seeing how this metal is to be included in the refined alloy.

In regards to claim 7, while Metz (A1) supports a prima facie case of obviousness for claim 1, Metz (A1) fails to teach the limitation of the instant claim. Although Metz's teaching (A1) supports the use of stainless steel as a ferroalloy, Metz's teaching (A1) does not support the use of the oxide of chromium as the particulate material (col. 1, li. 30-33), as described earlier in a response to claim 4. Furthermore, as described earlier in a response to claim 4, Edlinger's teaching (A6) supports the use of oxide of chromium as a particulate material (abstract). This being the case, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Metz (A1) with the addition of the chromium-containing dust taught by Edlinger (A6) in order to adjust the slag basicity (abstract).

In regards to claim 8, while Metz (A1) supports a prima facie case of obviousness for claim 1, Metz (A1) fails to teach the limitation of the instant claim. Although Metz's teaching (A1) supports the use of ferromanganese as a ferroalloy, Metz's teaching (A1) does not support the use of the oxide of manganese as the particulate material. However, it would have been obvious to one of ordinary skill in the art to try the oxide of manganese as the particulate material. Being that in the event where the ferroalloy is

ferrochrome and the particulate material is an oxide of chromium, it would have been obvious that in the event where the ferroalloy is ferromanganese, the particulate material is an oxide of manganese. This is a case of the simple substitution of one known element for another to obtain predictable results.

4. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Metz (A1) as applied to claim 1 above, and in view of Mathur (EP0866139 hereinafter A3).

Claim 14 further limits claim 1, wherein the second gas jet is formed of burning gases. While Metz (A1) fails to teach this limitation, Mathur (A3) teaches a lance for a molten metal furnace, in which there is a flame envelope, meaning "a combusting stream substantially coaxial with the main gas stream and annular thereto" (p. 2, para. 3rd from bottom, beginning "as used herein the term 'flame envelope'..."). While Metz does not teach this stream to be a jet, Mathur teaches it to be a combusting stream which envelops the main stream. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Metz (A1) with the flame envelope taught by Mathur (A3) in order to protect "the main gas from entrainment of ambient gases as it passes through the headspace of the furnace" (abstract, li. 5-6).

7. Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Metz (A1) as applied to claim 15 above, and in view of Pavlicevic (US 6,322,610 hereinafter A2).

Claims 16-18 are dependent on claim 15.

In regards to claim 16, while Metz (A1) supports a prima facie case of obviousness for claim 15, Metz (A1) fails to teach the limitations of claim 16. Pavlicevic

(A2) however teaches these limitations. Pavlicevic (A2) teaches an integrated device to inject oxygen, technological gases and solid material in powder form, in which two nozzles form part of a lance comprising a thin axial channel (figure 12, labeled **30**) terminating at its outlet and in the first Laval nozzle (figure 12, labeled **20**), a shrouding gas passage (figure 12, the outer dotted area with the arrows) about the main gas passage terminating at its outlet end in the second nozzle (figure 12, labeled **14**), and a particulate material transport passage having an axial outlet which communicated with the first Laval nozzle (figure 12, the inner dotted area with the arrows). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Metz's invention (A1) with the lance structure taught by Pavlicevic (A2) in order to inject the matter in a manner to "ensure maximum efficiency and yield, minimum wear, and minimum difficulty in use and manipulation (col. 3, li. 40-44). Furthermore, in regards to the claim limitation where the second nozzle is a Laval nozzle, while Pavlicevic (A2) teaches the second nozzle to be a convergent one (col. 11, li. 17-20), it would have been obvious to one of ordinary skill in the art to try various shapes (pipe, convergent, Laval) in order to determine a suitable shape of the second nozzle for the given invention.

In regards to claim 17, Metz (A1) in view of Pavlicevic (A2) support a prima facie case of obviousness for the claim limitations of claim 16. In addition, in Pavlicevic's invention (A2) the axial outlet terminates in a divergent part of the first Laval nozzle (figure 12, labeled **30**).

In regards to claim 18, Metz (A1) in view of Pavlicevic (A2) support a prima facie case of obviousness for the claim limitations of claim 16. In addition, in Pavlicevic's invention (A2) the outer surrounding passage comprises a combustion chamber (col. 7, li. 45-49).

Conclusion

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTINE CHEN whose telephone number is (571)270-3590. The examiner can normally be reached on Monday-Friday 8:30am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571) 272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Vickie Kim/
Supervisory Patent Examiner, Art Unit 4116